

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Alexander Josef
Serial No. : 10/521,985
Filing Date : 07/19/2005
Group Art No. : 1616
Examiner : Brown, Courtney A
Title : AGROCHEMICAL COMPOSITION
CONTAINING PHOSPHITE AND
PROCESS FOR THE PREPARATION
THEREOF

RESPONSE TO OFFICE ACTION

VIA ELECTRONIC FILING
Commissioner for Patents

SIR:

The following remarks are submitted in response to the Office Action dated
January 21, 2009.

In the Office Action, claims 1-2, 4-6, 8-10, 12-19, 21, 23, 24, 26 and 40 were rejected as being unpatentable over Alyeshmerni et al. (WO 00/76941 A1) in view of Dean et al. (US 6,245,717 B1) and Freepons (US 5,139,555). The Applicant respectfully traverses the Examiner's rejection, and reconsideration in view of the amendments made herein is respectfully requested.

The Applicant notes that his previous arguments and amendments, including amended claim 1 disclosing a solidified molten homogenous mixture, have indeed successfully overcome the obviousness objection of the Examiner in view of the combined teaching of Alyeshmerni et al. (WO 00/76941 A1) and Dean et al. (US 6,245,717 B1). However, the Examiner now cites Freepons (US 5,139,555), alleging that the combination of that reference with the two above-cited references renders the present invention obvious for an average person skilled in the art.

As mentioned by the Examiner on page 4 of the outstanding Office Action, the present invention relates to a *solidified molten homogeneous mixture*; the molten mixture containing *phosphorous acid* and at least one other NPK nutrient, metal microelements, and a base selected from potassium carbonate and potassium hydroxide in an amount to at least partially neutralize said acid, *at a temperature of from 60°C to 130°C*; cooled and broken to water-soluble, granular, free-flowing agrochemical composition, not leaving harmful or useless deposits in the soil, of uniform particle size containing from 0% to 1% water.

The Alyeshmerni reference (WO 00/76941 A1) relates to potassium phosphite fertilizer formulations, processes for producing them, and methods to deliver them to plants, wherein said potassium phosphites are produced by reacting a salt of phosphorus-containing acid with a base (page 5, line 29-33). It should be noted that Alyeshmerni relates to phosphorus-containing acids, *i.e.*, acids containing phosphorus atoms, and not to phosphorous acid in particular - also called phosphonic acid (see, for instance, Fig. 1 in Alyeshmerni, wherein various phosphorus-containing acids that can be combined with potassium are illustrated). The fertilizer formulations of Alyeshmerni might be dry or aqueous, homogenous or non-homogenous (page 8, line 28), solid or granular (page 9, line 24).

The Dean et al. reference (US 6,245,717) relates to a method for suppressing the productions and/or movement of auxin in higher plants (column 2, lines 17-19) by the application of an anti-auxin, which may be in the form of a granule, powder, or liquid (column 4, lines 57-58). Dean et al. teach agrochemical compositions that may also comprise humic acid (column 8, line 66), micronutrients (column 6, lines 62-64) and complexing agents (column 7, line 60-end to column 8, lines 1-24).

The Freepons reference (US 5,139,555) relates to a process of furnishing slow release nitrogen to field soil comprising inserting and distributing in the soil, in particulate or granular form, melamine, ammeline, cyanuric acid, mixtures thereof, their salts, and mixtures thereof. The granules of Freepons comprise a poorly soluble nitrogen source and a binder (column 7, lines 54-56). As mentioned by the Examiner in the present Office Action (on page 5, last line), the binder is chosen to be

compatible with the soil (column 7, line 67) and can be selected from among readily soluble inert materials (column 7, lines 63-66), insoluble materials such as lignine sulfonate (column 8, lines 14-15), or a solidified soluble material having plant nutritive value such as urea and ammonium nitrate (column 8, lines 17-19).

However, none of the above-cited references, taken alone or in combination, teaches or suggests a solidified molten homogeneous mixtures containing phosphorous acid, wherein said melting temperature has been from 60°C to 130°C.

Freepons, whose compositions are distinct from the compositions of the present invention, teaches the use of a solidified soluble material having plant nutritive value such as urea and ammonium nitrate (column 8, lines 17-19) as a possible binding agent. Urea and ammonium nitrate, either alone or in combination, are commonly used in the agricultural field for both their nitrogen nutritive values and their binding properties, for example in the formation of agrochemical prills (see Freepons, column 8, lines 24-25). However, the present invention teaches granules made from a solidified mixture of molten phosphorous acid.

It was applicant's idea to melt phosphorous acid and to use it as a gluing material for other compounds, while the glue itself provides fertilizing and pesticidal effects in the soil without leaving deposits, wherein the "gluing process" is performed at relatively low temperature. Freepons, when melting urea, risks its decomposition (see enclosed page listing physical properties of urea, excerpted from the online Chembiofinder database). Therefore, phosphorous acid, which has a low melting

point of 73°C (see enclosed page), was found to provide several advantages when used in the production of agrochemical fertilizing granules. Upon solidification, the granules demonstrate surprising physical properties, such as free-flowing, non-caking and low hygroscopicity, without any further chemical treatment.

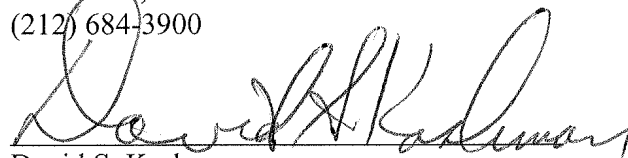
Therefore, the Applicant respectfully submits that an average skilled person in the art would easily understand the significance and inventiveness of the present invention, and would not find that invention to be obvious in view of the cited references. The present invention teaches homogenous granules, easy to handle, which acquire their specific physical properties by solidifying a molten mixture containing phosphorous acid, which mixture had been melted at a temperature from 60°C to 130°C. To the knowledge of the applicant, *it is the first time that phosphorous acid has been used in a molten phase to produce a matrix* into which other components may be dispersed, in order to produce, after cooling, a solidified homogeneous mixture. Compared to urea or ammonium nitrate binders, which have melting points of 135°C or 169.6°C, respectively (see enclosed pages), the use of phosphorous acid enables lower energy consumption, lower temperature when forming the final product (hence avoiding the heat degradation of other components in the mixture), and the presence of a component having a phosphorus nutritive value as well as pesticidal properties in the final agrochemical formulation. The average skilled person in the art would not have found in Freepons et al. any indications that fertilizer granules could have been made with a phosphorous acid matrix.

In view of the above arguments, applicant respectfully submits that the invention, as described in the present claims, is novel and non-obvious over the cited documents, either alone or in combination. It is therefore believed that the instant amended claims are now ready for allowance.

Early and favorable action is respectfully requested.

The Commissioner is requested to construe this paper as including a retroactive petition for a one-month extension of time in which to file a response to the outstanding Office Action, and accordingly, the official fee of \$130.00, as prescribed therefor by 37 C.F.R. 1.17(a)(2), as amended, in the case of a non-small entity, is being submitted herewith. The Commissioner is hereby authorized to charge any deficiency in any fees due with the filing of this paper or during the pendency of this application, or to credit any overpayment in any fees, to our Deposit Account No. 07-1730.

Respectfully submitted,
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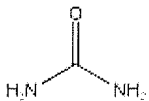


David S. Kashman
Reg. No. 28,725

Date: May 19, 2009
New York, NY

Urea [57-13-6]

Synonyms: aquadrate; ureaphil; ureophil; Carbamimidic acid; Isourea; Urea; Carbamide; Carbonyl diamine; Aquacare/HP; Nutriplus; Urecare; Urederm;

	Tools		CAS RN Lookup	
	VIEW CHEMDRAW STRUCT		VIEW AT CHEMACK	
	VIEW CHEM3D MODEL		NCI DATABASE	
	VIEW LINKS		THE MERCK INDEX	

Formula $\text{CH}_4\text{N}_2\text{O}$

CAS RN 57-13-6

ACX Number X1001457-4

Density 1.335

Refractive Index

Evaporation Rate

Flash Point (°C)

DOT Number

Comments White crystals or powder. Chaotropic agent for proteins.

Molecular Weight 60.0554

Melting Point (°C) 135

Boiling Point (°C) (dec)

Vapor Density

Vapor Pressure

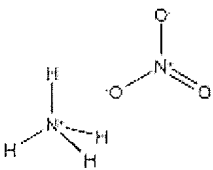
Water Solubility Soluble

EPA Code

RTECS YR6250000

Ammonium nitrate [6484-52-2]

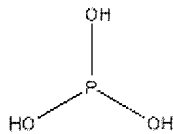
Synonyms: Ammonium nitrate; Ammonium (I) nitrate; Nitric acid, ammonium salt; Varioform;

	Tools	CAS RN Lookup
	VIEW CHEMDRAW STRUCT	VIEW AT CHEMACX
	VIEW CHEM3D MODEL	NCI DATABASE
	VIEW LINKS	THE MERCK INDEX

Formula	H ₄ N ₂ O ₃	
CAS RN	6484-52-2	
ACX Number	X1002148-4	
Density	1.725	
Refractive Index		Molecular Weight 80.0432
Evaporation Rate		Melting Point (°C) 169.6
Flash Point (°C)		Boiling Point (°C) 210
DOT Number	UN 0222; UN 0223; UN 1942; NA 1942 Oxidizer; UN 2067 Oxidizer; UN 2068; UN 2069 Oxidizer; UN 2070; UN 2071; UN 2072; UN 2426 Oxidizer	Vapor Density 2.8 Vapor Pressure Water Solubility 118 g/100 mL. Soluble EPA Code RTECS BR9050000
Comments	May explode under high temperatures or confinement. HYGROSCOPIC.	

Phosphorous acid [13598-36-2]

Synonyms: Phosphorous Acid; Phosphonic Acid;

	<p>Tools</p> <p>VIEW CHEMDRAW STRUCT</p> <p>VIEW CHEM3D MODEL</p> <p>VIEW LINKS</p>	<p>CAS RN Lookup</p> <p>VIEW AT CHEMACK</p> <p>NCI DATABASE</p> <p>THE MERCK INDEX</p>
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Formula $\text{H}_3\text{O}_3\text{P}$

CAS RN 13598-36-2

ACX Number X1007376-8

Density 1.651

Refractive Index

Evaporation Rate

Flash Point (°C)

DOT Number

Comments HYGROSCOPIC/AIR SENSITIVE.

Molecular Weight 81.99566

Melting Point (°C) 73

Boiling Point (°C)

Vapor Density

Vapor Pressure

Water Solubility

EPA Code

RTECS SZ6400000